

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 0 999 976 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

23.10.2002 Bulletin 2002/43

(21) Application number: **98937372.5**

(22) Date of filing: **31.07.1998**

(51) Int Cl.7: **B64C 1/32**, E05B 53/00

(86) International application number:
PCT/CA98/00739

(87) International publication number:
WO 99/007600 (18.02.1999 Gazette 1999/07)

(54) **EMERGENCY EXIT SYSTEM**

NOTAUSGANGSVORRICHTUNG

SYSTEME POUR ISSUE DE SECOURS

(84) Designated Contracting States:
DE FR GB IT

(30) Priority: **05.08.1997 US 54794 P**

(43) Date of publication of application:
17.05.2000 Bulletin 2000/20

(73) Proprietor: **HER MAJESTY THE QUEEN as
represented by THE MINISTER OF NATIONAL
DEFENCE OF HER MAJESTY'S CANADIAN
GOVERNMENT
Ottawa, Ontario K1A 0K2 (CA)**

(72) Inventors:
• **BROOKS, Christopher, J.
Dartmouth, Nova Scotia B2W 6A2 (CA)**

• **BOHEMIER, Albert, P.
Cole Harbour, Nova Scotia B2Z 1C5 (CA)**
• **MILLER, Lee, R.
Dartmouth, Nova Scotia B2Y 3P4 (CA)**

(74) Representative: **Jackson, Derek Charles et al
Derek Jackson Associates
The Old Yard
Lower Town
Claines Worcester WR3 7RY (GB)**

(56) References cited:
EP-A- 0 592 317 DE-A- 2 433 525
GB-A- 761 627 GB-A- 1 328 360
US-A- 3 851 845 US-A- 3 885 761
US-A- 3 975 981

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Description

[0001] This invention relates to an emergency exit system and in particular to an emergency exit system for use on a helicopter or other aircraft.

[0002] Vehicle accidents occurring in water have a lower survival rate than accidents occurring on land. In water accidents, the vehicles usually sink very rapidly, either in an upright or inverted position. Underwater conditions are drastically different from land based conditions. Visibility is reduced - the majority of people can see only 1.5 meters underwater and 3.1 meters in the best lit conditions. Survivors of a crash or forced landing must depend on their breath-holding ability to make a successful escape. Generally, a person's breath-holding ability is reduced 25 - 50% in water under 15°C. Maximum breath-holding time can be as short as 10 seconds. Survivors are often disoriented due to the sudden immersion in water, loss of gravitational references, poor depth perception, nasal inhalation of water and darkness. Disorientation is magnified when the vehicle is inverted. Under the latter condition, finding a handle to jettison an escape door or window, which is a simple procedure to execute in an upright position on dry land, can be a most challenging task even if the handle is only a few centimeters away from the survivor's hand.

[0003] Usually handles for open escape doors or windows are small, and are positioned between knee and chest level. The various positions would not be obvious to the survivor unless he or she is familiar with the particular escape system. Most existing mechanisms are adapted to remove an entire door or window, including the frame, requiring a complicated jettison mechanism, which is not always dependable. Moreover, existing systems do not provide feedback to indicate that the door, window or hatch has been successfully jettisoned.

[0004] GB-A-761 627 and US - A-3851845 disclose systems for the jettisoning of aircraft canopies or doors which are inappropriate for use in a door or window release. The U.S. reference teaches the use of lever or a lever and a handle combination for releasing a door. When submerged in water such a system could be difficult to operate, particularly when it is necessary to operate a handle and a separate lever to effect release of the door.

[0005] The object of the present invention is to provide an emergency exit system of the type which includes a plurality of actuators adapted to operate independently of one another to effect release of a window or door panel to provide an escape exit.

[0006] Accordingly, the present invention relates to an emergency exit system including a frame for mounting in a vehicle, said frame having an opening for closing by a panel, a plurality of spaced apart latch means for releasably latching said panel in the frame; release means for simultaneously releasing all of said latch means; and principal actuation means located at a plurality of locations around the periphery of said frame for

actuating said release means when any of said actuation means is actuated, characterised by cable means forming part of said release means and extending around a substantial portion of said frame to interconnect the release means associated with each said latch means.

[0007] The invention is described below in greater detail with reference to the accompanying drawings, which illustrate preferred embodiments of the invention, and wherein:

Figure 1 is a perspective view of a window emergency exit system in accordance with the invention; Figures 2 and 3 are front elevation views of the interior of the exit system of Fig. 1 with parts removed; Figure 4 is a isometric view of portions of actuation and release mechanisms used in the exit system of Fig. 1;

Figure 5 is a schematic, partly a sectioned view taken along line a-a of Fig. 1;

Figure 6 is an elevation view of the interior of the exit system of Fig. 1 with parts removed;

Figure 7 is a front elevation view of the interior of a second embodiment of the door emergency exit system;

Figure 8 is a front elevation view of the of the door exit system of Fig. 7 with parts removed;

Figure 9 is a schematic, cross section taken generally along line b-b of Fig. 7;

Figure 10A is a front view of a hinge assembly used in the exit system of Fig. 7; and

Figure 10B is a front view of a plate and a section of cable for releasably retaining the hinge assembly of Fig. 10A.

[0008] Referring to Figures 1 to 3, one embodiment of the emergency exit system, which is generally indicated at 2, is a window for mounting in the fuselage of an aircraft such as a helicopter (not shown). However, the system may also be a door, a hatch or any other type of exit adapted for mounting in a closed body such as the body of a vehicle, e.g. a car, bus or truck, the fuselage of an airplane or a wall of a building.

[0009] Generally, the emergency exit system 2 includes a rectangular frame 4 defining a central opening 6, a closure panel 8 such as a metal sheet releasably secured in the opening 6 by a plurality of latches 10 extending from the frame 4; a release mechanism 12 (Figures 2 and 3) in the frame 4 and an actuation mechanism on the inner side of the frame 4 including four bars 14 (Fig. 1), which are independently operable to simultaneously effect the release of all of the latches 10 to enable jettisoning of the closure panel 8 to provide an emergency exit.

[0010] The frame 4 includes interconnected exterior and interior panels 16 and 18, respectively. The interior panel 18 is sufficiently thick to contain the actuation mechanism 12 (Figures 2 or 3). Four closed compart-

ments 20 extend from the corners of the inner panel 18 for receiving the bars 14 therebetween. The compartments 20 contain parts of the release mechanism 12 and an emergency lighting assembly 21 (Figure 6), both of which are described in detail below.

[0011] In contrast to prior art emergency exit systems, the exit system 2 of the present invention includes a plurality of actuation bars 14. The bars 14 are mounted in obvious locations, i.e. they extend along the interior of the sides 22 and the top and bottom ends 23 and 24, respectively of the frame 4, so that they can be easily located and accessed, thus significantly improving the chances of escape and survival of trapped survivors. Each bar 14 includes an elongated cylindrical body 25 with a press fitted lever 26 at one end thereof. The bars 14 are individually connected to the release mechanism 12 in such a manner as to be independently operable. Actuation of any one of the bars 14 will simultaneously disengage all of the latches 10 to release the panel 8 from the frame 4. This minimizes the number of operations and amount of energy required by the survivor to release the panel 8. All of the energy of the operator will be applied to the release of the panel 8 rather than for actuation of the remaining bars 14. Moreover, if one bar 14 malfunctions, another may be used to serve the same function. The panel 8 is jettisoned by pulling any one of the bars 14 towards the operator and away from the frame 4.

[0012] The bars 14 are rotatably mounted relative to the compartments 20 between first and second limit positions. In the first limit position, the panel 8 is secured in the opening 6. In the second limit position, the panel 8 is released from the frame 4.

[0013] Each release mechanism 12 is connected to one end of each bar 14. Referring to Figures 2 to 4, rotation of one bar 14 is transmitted to its associated release mechanism 12 and then to the plurality of latches 10 to simultaneously retract each latch 10 inwardly into the frame 4 to release the panel 8. The release mechanism 12 is switchable between a locked or latched position (Fig. 2) in which the latches 10 extend inwardly from the frame 4 and a release position (Fig. 3) in which the latches 10 are retracted into the frame 4.

[0014] Each release mechanism 12 is designed to translate rotational movement of the bar 14 and a lever 26 at one end of the bar into movement necessary to disengage the latches 10. Referring to Fig. 4, each release mechanism 12 includes a helical gear or rack 28 mounted on a shaft 29 near one end thereof. The gear 28 is connected by a gear or pinion 30 and a shaft 31 to a lever 26. Rotation of the lever 26 around the longitudinal axis of the shaft 31 results in a corresponding rotation of the shafts 29 and 31. The shaft 29 is rotatably mounted in ball bearings (not shown) in arms 33 and 34 of a generally C-shaped bracket 35. The shaft 31 is also mounted in the bracket 35 perpendicular to the shaft 29. It will be appreciated that the bracket 35 and the shafts 29 and 31 are housed in the compartments 20. The end

of the shaft 29 extending through the arm 34 of the bracket 35 extends through an opening in the frame 4 and carries a pinion 40. The pinion 40 meshes with a rack 42 for imparting longitudinal movement thereto when the pinion is rotated. The pinion 40 is retained on the shaft 29 by a key (not shown) and a nut 44.

[0015] A cable 45 extends through and is freely slidable in the rack 42. The cable 45 extends around idler pulleys 47 located at the corners of the frame 4. A conventional cable tensioner 48 (Figs. 2 and 3) maintains the cable 45 under the desired tension. A stop 50 is fixedly mounted on the cable 45 for engaging one end of the rack 42. When the rack 42 is moved in one direction (indicated by arrows A in Fig. 2), it pushes against the stop 50 to move the cable 45 in the same direction. Movement of the cable 45 causes rotation of a second lever 54 (Fig. 4) mounted in the frame for operating a latch 10. The lever 54 includes a tapering body 56 with a generally U-shaped notch 57 in an outer end thereof for receiving a pin 59 attached to the cable 45. Thus, movement of the cable 45 will cause rotation of the lever 54, the inner end 60 of which is rotatably mounted in the frame 4. Such inner end 60 of the lever 54 includes teeth defining a pinion for engaging a rack 62 slidably mounted in the frame 4. The rack 62 forms part of the latch 10. A pin 63 with a tapered outer end extends outwardly from the rack 62 for retaining the panel 8 in the frame 4. When the pin 63 is retracted, the panel 8 is released for jettisoning.

[0016] It is readily apparent that rotation of one lever 26 will cause movement of the cable 45, and consequently simultaneous release of all of the latches 10. Movement of the lever 26 and the cable 45 in the opposite direction will result in extension of the pin 63 to the latched or locking position (Fig. 4). In the locked position the pins 63 engage grooves or indentations 65 (Fig. 2) in the panel 8. From Figs. 2 and 3, it will be noted that a rack 42 and pinion 40 arrangement is associated with each bar 14, so that rotation of any bar 14 results in the release of all of the latches 10.

[0017] Once the latches 10 have been released, the bars 14 are locked in the release position by a locking mechanism generally indicated at 68 in Fig. 5. Each locking mechanism 68 includes a lever 69 (Figs. 1 and 5) mounted on the end of each bar 14 opposite to the end carrying the lever 26. The lever 69 is mounted on one end of a shaft 70, which is rotatably mounted in one end 71 of the compartment 20 and in an L-shaped bracket 73. An arm 74 is mounted on the inner end 75 of the shaft 70 for rotation therewith. The arm 74 is guided between the panel latched and release positions by a pin 77 extending inwardly from the bracket 73 into an arcuate slot 78 in the arm. The arm 74 and consequently the lever 69 are releasably retained in the panel latched position by a detent pin 80, which extends into a shallow conical depression 81 in the bracket 73. The pin 80 extends outwardly from a cylindrical barrel 81 mounted in the end of the arm 74 opposite to the end 75 receiving

the shaft 70. A helical spring 83 bears against the head 84 of the pin 80 for biasing the outer end thereof into the depression 81. When the bar 14 is rotated from the panel latching position (shown in solid lines in Fig. 5) to the panel release position (shown in phantom outline in Fig. 5) the arm 74 is also rotated. The pin 80 escapes from the depression 81 and is rotated with the arm 74 to the panel release position in which the pin 80 encounters a hole 86 extending through the bracket 73 and the end 71 of the compartment 20. Thus, the arm 74 and consequently the lever 69 and the bar 14 are locked in the panel release position.

[0018] Referring to Figs. 2 and 3, a plurality of ejectors 88 are provided on the interior of the frame 4. The ejectors 88 are spring loaded plungers for biasing the panel 8 outwardly from the frame 4. Immediately following release of the panel 8 by the latches 10, the ejectors 88 push the panel 8 outwardly to clear the opening 6.

[0019] In operation, one or more bars of the actuation mechanism is pulled towards the operator and away from the limit positions defined by the detent pin 80, the depression 81 and the hole 86. Rotation of a bar 14 causes pivoting of a lever 26 on one end of the bar 14, and consequently rotation of the shafts 31 and 29, and the pinion 40. Rotation of the pinion 40 results in movement of the rack 42 and the cable 45 which translates into rotation of all of the levers 54 to release the latches 10. The panel 8 is thus free to move and is pushed out of the frame 4 by the ejectors 88.

[0020] An auxiliary actuator generally indicated at 89 (Figs. 2 and 3) for the panel 8 includes a pulley 90 rotatably mounted in one corner of the frame 4. A notch 91 in the pulley 90 engages a pin 91, which is attached to the cable 45. The auxiliary actuator can override the release mechanism 12. The pulley 90 is rotated by either of two levers defined by handles 94 (one shown - Fig. 1) mounted on the ends of a shaft carrying the pulley. The handles 94 are located on the interior and exterior lower corners of the frame 4 (i.e. inside and outside the window). Rotation of either handle 94 results in simultaneous release of all latches 10.

[0021] With reference to Fig. 1, a preferred form of panel 8 includes a sash 96 carrying a panel, which is sealed in the sash 96 by a rubber molding 98. The panel 8 can be removed from the sash 96 by removing the molding 98.

[0022] Once removed, the panel 8 can be re-installed in the opening 6 by pushing the panel as far as possible into the opening to compress the plungers of the ejectors 88. The detent pins 80 are pushed out of the holes 86, and the bars 14 are rotated to return the pins 80 to the latched position in the recesses 81. The panel 8 is secured in the opening 6 by rotating either one of the handles 94 to return the latches 10 to locked position.

[0023] Referring to Fig. 6, the emergency lighting assembly 21 is used to illuminate the opening 6 and to provide an indication of whether the panel 8 is latched or released. When the lighting is constant, the panel 8 is

in the latched condition, and strobe lighting indicates that the panel 8 has been released. The lighting system 21 includes a plurality of high intensity light emitting diodes (LEDs) 100 in the bars 14 and on the auxiliary release 89, a strobe switch 102 on the frame 4 to indicate when the panel 8 has been jettisoned, light actuation elements (not shown) and a power pack 103 external to the frame 4. The power pack 103 is connected to the remainder of the lighting system by a cable 105. The power pack 103 includes a microprocessor (not shown) for controlling the lighting system.

[0024] The light actuation elements include an immersion sensor, an impact sensor, a roll over sensor and a pilot operated on-off switch (none of which are shown). The sensors are mounted on the aircraft fuselage or incorporated in the power pack 103. The immersion sensor is triggered when the aircraft is submerged in water, the impact sensor is triggered when a predetermined impact force has been exceeded, and the roll over sensor is triggered when the aircraft rolls over. The pilot switch is mounted on the console of the aircraft, permitting manual activation of the lighting system. All of the sensors and the switch are wired in parallel so that any one of them can be used to activate the emergency lighting system.

[0025] When the lighting system is activated, the LEDs 100 will be simultaneously activated to illuminate the release bars 14 and the handles 94. The bars 14 and the handles 94 will remain illuminated until the system is deactivated, or until the panel 8 is released and jettisoned. The strobe mode is activated by one of the spring loaded ejectors 88 which closes the strobe switch 102. Strobe lighting will continue as long as the panel 8 is free of the frame 4.

[0026] A second embodiment of the emergency exit system for use in a door is illustrated in Figs. 7 to 10. The second embodiment of the system includes a frame 4 with an opening 6 therein which is closed by a panel 8 (in this case defining a door). The panel 8 includes a window 110, and flanges 111 extending along the periphery thereof for sealing against the fuselage 112 (Fig. 9) of a helicopter in the closed position.

[0027] The panel 8 is mounted in the frame 4 by means of hinges 113, which permit rotation of the panel 8 between the open and closed positions. The panel 8 is normally opened and closed using a handle 114 and plungers 115 (Fig. 7), all of which are connected to the handle 14. An actuating mechanism similar to the same mechanism in Figs. 1 to 4 includes a plurality of independently operated bars 14 for initiating release of the door panel 8. The bars 14 are connected to a release mechanism generally indicated at 12 (Fig. 8) housed in compartments 116 in the manner described above in connection with Figs. 1 to 4. In the embodiment of the invention, movement of one of the bars 14 to the release position causes actuation of the release mechanism, which includes the latches 117. The release mechanism also releases the hinges 113 to release the panel 3 com-

pletely from the frame 4. The latches 117 are interconnected by a cable 118 (Fig. 8), which extends around pulleys 119 at the bottom corners of the frame 4 and returns around the top end thereof, i.e. the cable 118 extends in two rows around the top and sides of the frame 4. Grooved rollers 122 are provided in the frame 4 for guiding the cable 118 around the frame.

[0028] Each latch 117 is pivotally mounted on the frame 4 to secure the panel 8 in the opening 6. An associated plunger 115 is mounted in the panel 8 adjacent the latch 117 to permit latching and unlatching of the door panel 8 during normal operation. More specifically, during normal operation, the door panel is latched by rotating the handle 114 (counterclockwise as shown in Fig. 7) to cause the plunger 115 to extend outwardly from the side of the panel into engagement with the latches 117. Rollers 122 on the outer ends of the plunger 115 engage the inner sides of the latches 117 (Figs. 7 and 8). By rotating the handle 114 in the opposite direction, the plungers 115 are retracted into the panel 8 to unlatch the panel permitting swinging of the door panel on the hinges 113 to the open position (Fig. 8).

[0029] As best shown in Fig. 8 each latch 117 includes an arm 123 connected to a pinion 124 (Fig. 8) rotatably mounted in the frame 4. The pinion 124 meshes with a rack 125 mounted on the cable 118. The rack 125 is engaged by a stop 127 (similar to the stops 50). When the cable 118 moves, the stop 127 moves the rack 125 to rotate the pinion 124 which in turn causes pivoting of the tab 123 through 45° to release the latch 115.

[0030] Referring to Figs. 10A and 10B, each hinge assembly 113 includes an arm 130 with holes therein for receiving bolts 131. A narrow end 133 of the arm 130 is rotatable mounted on a pin defined by a bolt 134 in a clevis 136. The bolt 134 is retained in the clevis 136 by nut 137. The body 139 of the clevis 136 tapers to an annular groove 140 and a head 141. The head 141 is inserted into the large end 143 of a keyhole slot 144 in a plate 145 mounted on the cable 120. By moving the head 141 into the narrow end 146 of the slot 144, the clevis 136 and the plate 130 are retained in engagement with the cable 120. When the cable 120 moves (upwardly in Fig. 10B), the clevis 136 and consequently the entire hinge is release. At the same time, the arms 123 of the latches 117 rotate 45° to release the plungers 115, whereby the entire door panel 8 is released for jettisoning.

[0031] The second embodiment of the invention also includes an auxiliary release mechanism 89 similar to the same mechanism in the first embodiment of the invention.

Claims

1. An emergency exit system including a frame (4) for mounting in a vehicle, said frame (4) having an opening (6) for closing by a panel (8), a plurality of

spaced apart latch means (10, 117) for releasably latching said panel (8) in the frame (4); release means (12) for simultaneously releasing all of said latch means (10, 117); and principal actuation means (14) located at a plurality of locations around the periphery of said frame (4) for actuating said release means (12) when any of said actuation means (14) is actuated, **characterised by** cable means (45, 118) forming part of said release means (12) and extending around a substantial portion of said frame (4) to interconnect the release means (12) associated with each said latch means (10, 117).

2. The emergency exit system of claim 1, including auxiliary actuation means (89) for operating said release means (12) independently of said principal actuating means (14).

3. The emergency exit system of claim 2, including ejector (88) means for ejecting said panel (8) from said frame (4) when released by said release means (12) to permit jettisoning of said panel (8).

4. The emergency exit system of claim 2, including a lighting assembly (21) for actuation by said principal actuation means (14) to light up the area of said opening (6) facilitating access to the emergency exit system.

5. The emergency exit system of claim 2, including lock means (68) for locking said release means (12) in the release position.

6. The emergency exit system of claim 1, wherein said latch means (10) include a plurality of plunger means (63) for releasably retaining said panel (8) in said frame (4), said release means (12) being adapted to move all said plunger means (63) from a latched position in which said panel (8) is retained in the frame (4) and a release position in which said panel (8) is free to escape said frame (4).

7. The emergency exit system of claim 6, wherein said panel (8) is a window, and said plunger means (63) are slidably mounted in said frame (4) for movement between panel engaging and panel release positions.

8. The emergency exit system of claim 7, wherein said principal actuation means (14) includes a plurality of individual bar means (14) rotatable on said frame (4) and connected to said plunger means (63), each bar means (14) adapted to individually move all said plunger means (63) to the release position.

9. The emergency exit system of claim 8, wherein said release means (12) includes first lever means (26) connecting said bar means (14) to said cable

means (45) for moving said cable means (45) and consequently said plunger means (63) to the release position.

10. The emergency exit system of claim 8, wherein said release means (12) includes second lever means (54) connected to said plunger means (63); and gear means (28, 30, 40, 42, 60, 62) connecting said first and second lever means (26, 54) for moving said plunger means (63) to the release position. 5
11. The emergency exit system of claim 10, wherein said release means (12) includes first rack and pinion means (40, 42) connecting said bar means (14) to said cable means (45) for moving said cable means (45); and second rack and pinion means (60, 62) connecting said cable means (45) to said plunger means (63) for moving said plunger means (63) from the panel engaging position to the release position. 10
12. The emergency exit system of claim 9, wherein said cable means (45) extends completely around the periphery of said frame (4). 15
13. The emergency exit system of claim 3, wherein said panel (8) defines a door, and said release means (12) includes latch means (117) pivotally mounted on said frame (4) for engaging said panel (8), and hinges (113) on one side of said panel (8) permitting opening of the panel (8), said hinges (113) being released from said frame (4) when said latch means (117) are released. 20
14. The emergency exit system of claim 4, wherein said lighting assembly (21) includes strobe switch means (102) in said frame (4) for causing strobing of the lighting assembly (21) when the panel (8) has been jettisoned. 25

Patentansprüche

1. Notausstiegssystem mit einem Rahmen (4) zum Einbau in einem Luftfahrzeug, wobei der Rahmen (4) eine Öffnung (6) zum Verschließen mit einer Platte (8), eine Mehrzahl an im Abstand voneinander angebrachten Verriegelungseinrichtungen (10, 117) für die einfache Verriegelung der Platte (8) im Rahmen (4), Entriegelungseinrichtungen (12) für die gleichzeitige Lösung aller Verriegelungseinrichtungen (10, 117) sowie an einer Mehrzahl von Stellen um den Umfang des Rahmens (4) angebrachte Hauptauslöseeinrichtungen (14) zur Betätigung der Entriegelungseinrichtungen (12) bei Betätigung der Auslöseeinrichtungen (14) aufweist, **gekennzeichnet** durch Kabelanordnungen (45, 118), die einen Teil 30

der Entriegelungseinrichtungen (12) bilden, sich um einen wesentlichen Teil des Rahmens (4) erstrecken und die Entriegelungseinrichtungen (12) mit den jeweils dazugehörigen Verriegelungseinrichtungen (10, 117) verbinden.

2. Notausstiegssystem nach Anspruch 1 einschließlich einer Hilfsauslöseeinrichtung (89) zur Bedienung der Entriegelungseinrichtungen (12) unabhängig von den Verriegelungseinrichtungen (14). 35
3. Notausstiegssystem nach Anspruch 2 einschließlich einer Ausstoßeinrichtung (88) zum Ausstoßen der Platte (8) aus dem Rahmen (4) bei Betätigung der Entriegelungseinrichtungen (12), um den Abwurf der Platte (8) zu ermöglichen. 40
4. Notausstiegssystem nach Anspruch 2 einschließlich einer Beleuchtungsvorrichtung (21) zur Betätigung durch die Hauptauslöseeinrichtung (14) für die Beleuchtung des Bereichs der Öffnung (6), um den Zugang zum Notausstiegssystem zu erleichtern. 45
5. Notausstiegssystem nach Anspruch 2 einschließlich einer Feststelleinrichtung (68) zum Feststellen der Entriegelungseinrichtung (12) in entriegelter Stellung. 50
6. Notausstiegssystem nach Anspruch 1, wobei die Verriegelungseinrichtung (10) eine Mehrzahl an Haltebolzen (63) zur lösbaren Feststellung der Platte (8) in Rahmen (4) aufweist, wobei die Entriegelungseinrichtung (12) so ausgestaltet ist, dass sie alle Haltebolzen (63) aus der verriegelten Stellung rückt, wobei die Platte (8) im Rahmen (4) gehalten wird, bzw. aus der entriegelten Stellung rückt, wobei die Platte (8) aus dem Rahmen (4) ausgestoßen werden kann. 55
7. Notausstiegssystem nach Anspruch 6, wobei die Platte (8) als Fenster ausgebildet ist und die Haltebolzen (63) in dem Rahmen (4) so verschiebbar gelagert sind, dass sie sich zwischen der eingerasteten und der gelösten Stellung der Platte (8) bewegen können. 60
8. Notausstiegssystem nach Anspruch 7, wobei die Hauptauslöseeinrichtung (14) eine Mehrzahl an Einzelstangen (14) aufweist, die drehbar an dem Rahmen (4) gelagert und mit den Haltebolzen (63) verbunden sind, wobei jede Stange (14) so ausgebildet ist, dass sie alle Haltebolzen (63) einzeln in die entriegelte Stellung rücken können. 65
9. Notausstiegssystem nach Anspruch 8, wobei die Entriegelungseinrichtung (12) einen ersten Hebel (26) aufweist, der die Stangen (14) mit dem Kabel (45) verbindet, um das Kabel (45) und damit die 70

Haltebolzen (63) in die entriegelte Stellung rücken zu können.

10. Notausstiegssystem nach Anspruch 8, wobei die Entriegelungseinrichtung (12) einen mit den Haltebolzen (63) verbundenen zweiten Hebel (54) sowie Zahnräder (18, 30, 40, 60, 62) aufweist; die den ersten und zweiten Hebel verbinden, um die Haltebolzen (63) in die entriegelte Stellung rücken zu können.
11. Notausstiegssystem nach Anspruch 10, wobei die Entriegelungseinrichtung (12) ein die Stangen (14) mit dem Kabel (45) verbindendes erstes Zahnstangengetriebe (40, 42) aufweist, um das Kabel (45) zu bewegen, und ein das Kabel (45) mit den Haltebolzen (63) verbindendes zweites Zahnstangengetriebe (60, 62) aufweist, um die Haltebolzen (63) aus der eingerasteten in die entriegelte Stellung rücken zu können.
12. Notausstiegssystem nach Anspruch 9, wobei das Kabel (45) um den gesamten Umfang des Rahmens (4) läuft.
13. Notausstiegssystem nach Anspruch 3, wobei die Platte (8) eine Tür darstellt und die Entriegelungseinrichtung (12) einen schwenkbar am Rahmen (4) gelagerten Riegel (117) aufweist, um die Platte (8) einzurasten und einseitig an der Platte Scharniere (113) aufweist, um die Öffnung der Platte (8) zu ermöglichen, wobei die Scharniere (113) von dem Rahmen (4) gelöst werden, wenn der Riegel (117) gelöst wird.
14. Notausstiegssystem nach Anspruch 4, wobei die Beleuchtungseinrichtung (21) einen Strobeschalter (102) in dem Rahmen (4) aufweist, der einen stroboskopischen Effekt der Beleuchtungseinrichtung (21) bewirkt, wenn die Platte (8) ausgestoßen worden ist.

Revendications

1. Système de sortie d'urgence composé d'un cadre (4) destiné à être posé sur un véhicule, ledit cadre (4) étant pourvu d'une ouverture (6) fermée par un panneau (8), de plusieurs dispositifs de verrouillage (10, 117) espacés les uns des autres et servant à assujettir de façon débloable ledit panneau (8) dans le cadre ou embrasure (4), de dispositifs d'ouverture (12) servant à déverrouiller simultanément tous ledits dispositifs de verrouillage (10, 117) et de dispositifs de manoeuvre principaux (14) répartis en plusieurs points à la périphérie dudit cadre (4) servant à actionner lesdits dispositifs d'ouverture (12) lorsque l'un ou l'autre d'entre eux est action-

né, **caractérisé par** un câble (45, 118) formant partie dudit dispositif d'ouverture (12) et disposé autour d'une partie substantielle dudit cadre (4) pour relier les dispositifs d'ouverture (12) rattachés auxdits dispositifs de verrouillage (10, 117).

2. Système de sortie d'urgence de la revendication 1, y compris le dispositif de manoeuvre auxiliaire (89) servant à actionner lesdits dispositifs d'ouverture (12) indépendamment dudit dispositif de manoeuvre (14).
3. Système de sortie d'urgence de la revendication 2, comprenant l'éjecteur (88) servant à éjecter ledit panneau (8) dudit cadre (4) lorsqu'il est dégagé par ledit dispositif de déblocage (12) en vue de permettre le largage dudit panneau (8).
4. Système de sortie d'urgence de la revendication 2, comprenant un éclairage (21) déclenché par ledit dispositif de manoeuvre principal (14) et servant à éclairer ladite ouverture (6), facilitant l'accès au système de sortie d'urgence.
5. Système de sortie d'urgence de la revendication 2, comprenant des dispositifs de verrouillage (68) servant à verrouiller lesdits dispositifs d'ouverture (12) en position ouverte.
6. Système de sortie d'urgence de la revendication 1, dans lequel lesdits dispositifs de verrouillage (10) comportant plusieurs plongeurs (63) servant à assujettir de façon débloable ledit panneau (8) dans ledit cadre (4), lesdits dispositifs d'ouverture (12) étant conçus pour faire passer lesdits plongeurs (63) d'une position de verrouillage qui retient ledit panneau (8) dans le cadre (4) à une position d'ouverture libérant ledit panneau (8) dudit cadre (4).
7. Système de sortie d'urgence de la revendication 6, dans lequel ledit panneau (8) est une fenêtre et lesdits plongeurs (63) sont montés de manière à coulisser dans ledit cadre (4) en vue de passer de la position d'assujettissement à celle de libération du panneau.
8. Système de sortie d'urgence de la revendication 7, dans lequel ledit dispositif de manoeuvre principal (14) comporte plusieurs tiges (14) pivotant sur ledit cadre (4) et reliées auxdits plongeurs (63), chaque tige (14) étant conçue pour actionner un à un tous lesdits plongeurs (63) en position d'ouverture.
9. Système de sortie d'urgence de la revendication 8, dans lequel ledit dispositif d'ouverture (12) comporte un premier levier (26) reliant ladite tige (14) audit câble (45) pour actionner ce dernier et par

conséquent lesdits plongeurs (63) en position d'ouverture.

10. Système de sortie d'urgence de la revendication 8, dans lequel le dispositif de déblocage (12) comporte un second levier (54) relié auxdits plongeurs (63) et des roues dentées (28, 30, 40, 42, 60, 62) reliant lesdits premier et second levier (26, 54) et servant à actionner les plongeurs (63) en position d'ouverture. 5
10
11. Système de sortie d'urgence de la revendication 10 dans lequel lesdits dispositifs d'ouverture (12) comportent une première crémaillère (40, 42) reliant lesdites tiges (14) audit câble (45) en vue d'actionner ledit câble (45) et une seconde crémaillère (60, 62) reliant ledit câble (45) auxdits plongeurs (63) en vue de faire passer lesdits plongeurs (63) de la position d'insertion dans le panneau à la position d'ouverture. 15
20
12. Système de sortie d'urgence de la revendication 9, dans lequel ledit câble (45) entoure complètement ledit cadre (4). 25
13. Système de sortie d'urgence de la revendication 3, dans lequel ledit panneau (8) constitue une porte et lesdits dispositifs d'ouverture (12) comportent des dispositifs de verrouillage (117) montés en pivot sur ledit cadre (4) et conçus pour s'insérer dans ledit panneau (8) et des charnières (113) sur un côté dudit panneau (8) permettant l'ouverture dudit panneau (8), lesdits charnières (113) se détachant dudit cadre ou embrasure (4) à l'ouverture desdits dispositifs de verrouillage (117). 30
35
14. Système de sortie d'urgence de la revendication 4, dans lequel ledit éclairage (21) comporte dans ledit cadre (4) un interrupteur à effet stroboscopique (102) qui déclenche le clignotement rapide de l'éclairage (21) une fois le panneau largué. 40

45

50

55

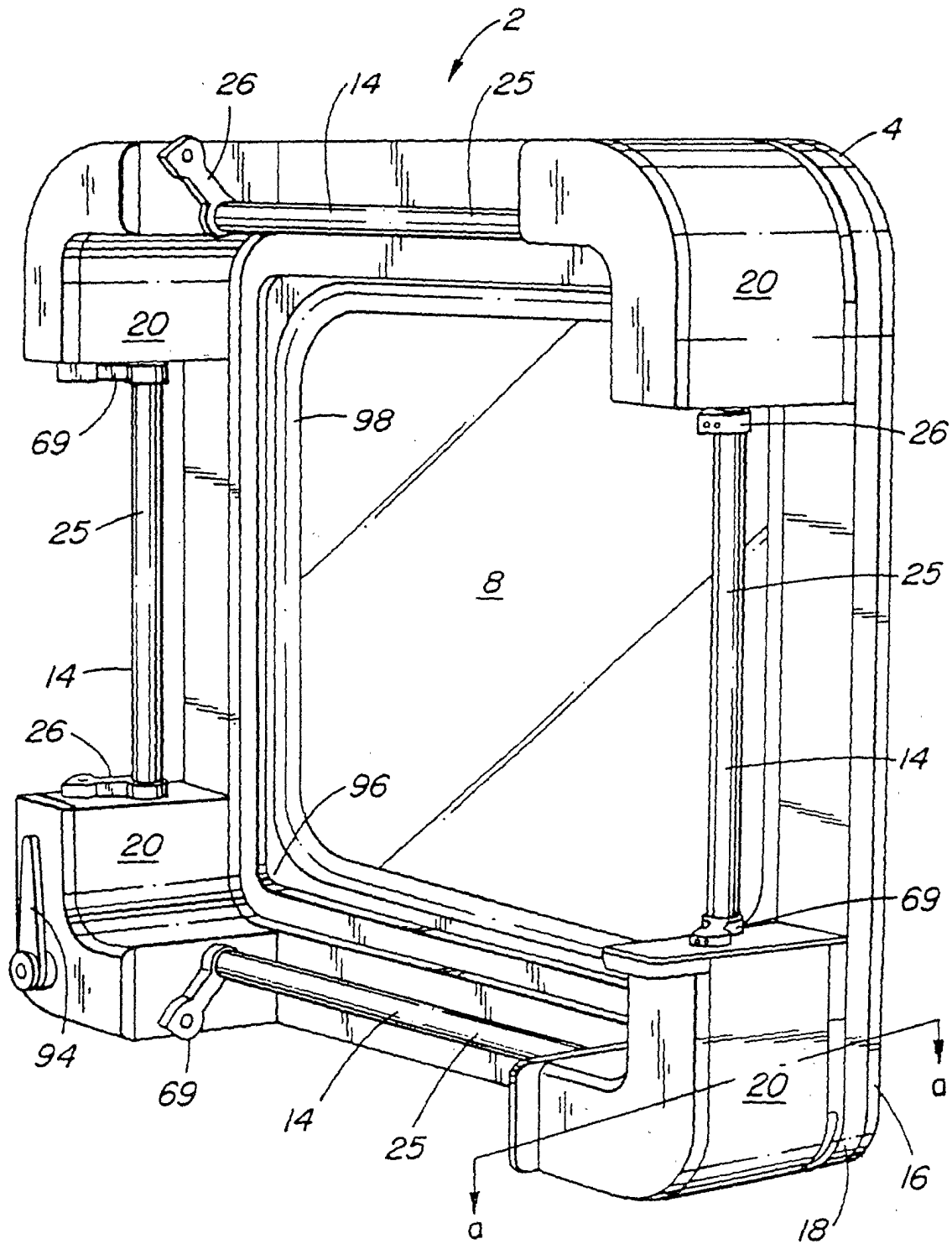


FIG. 1

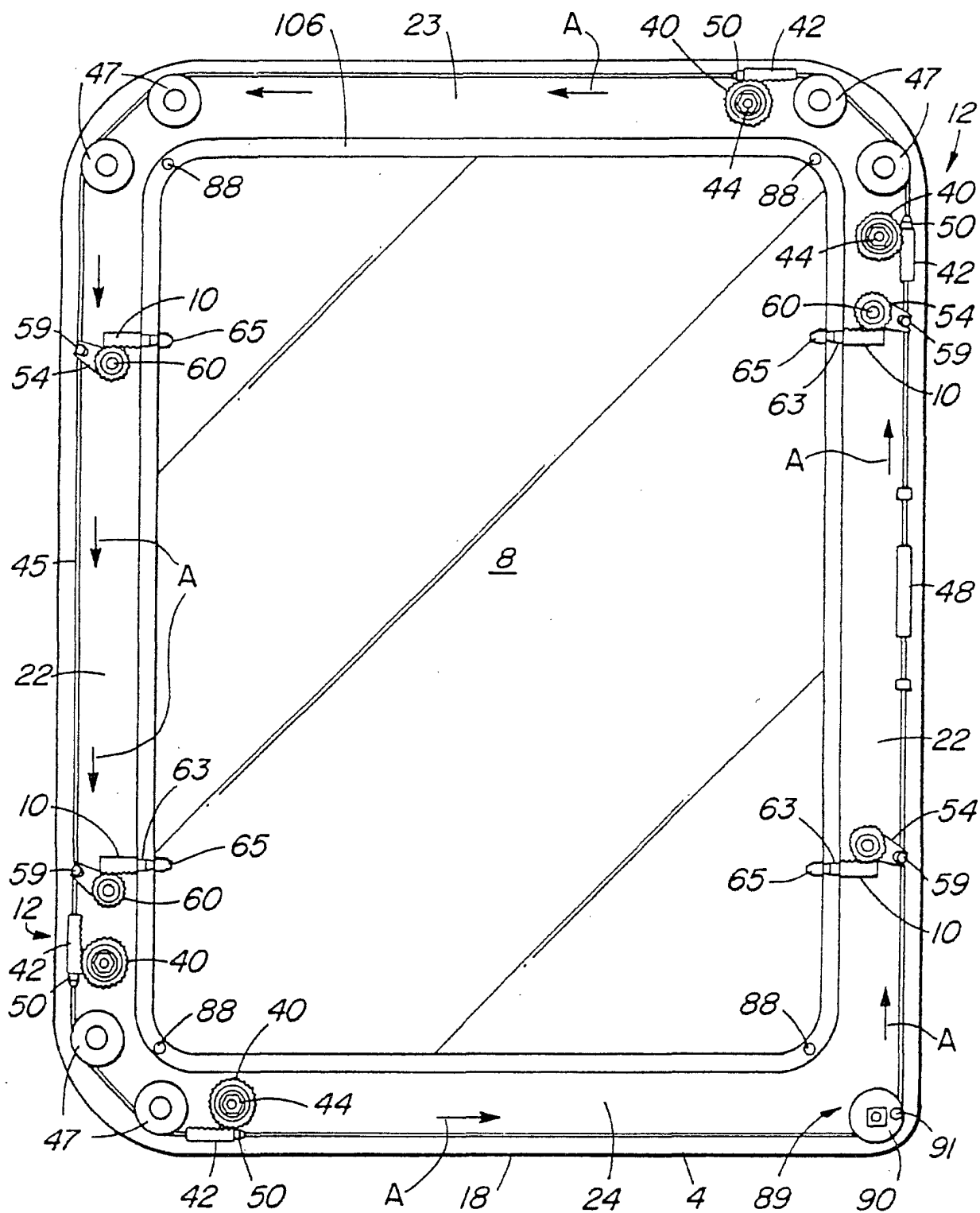


FIG. 2

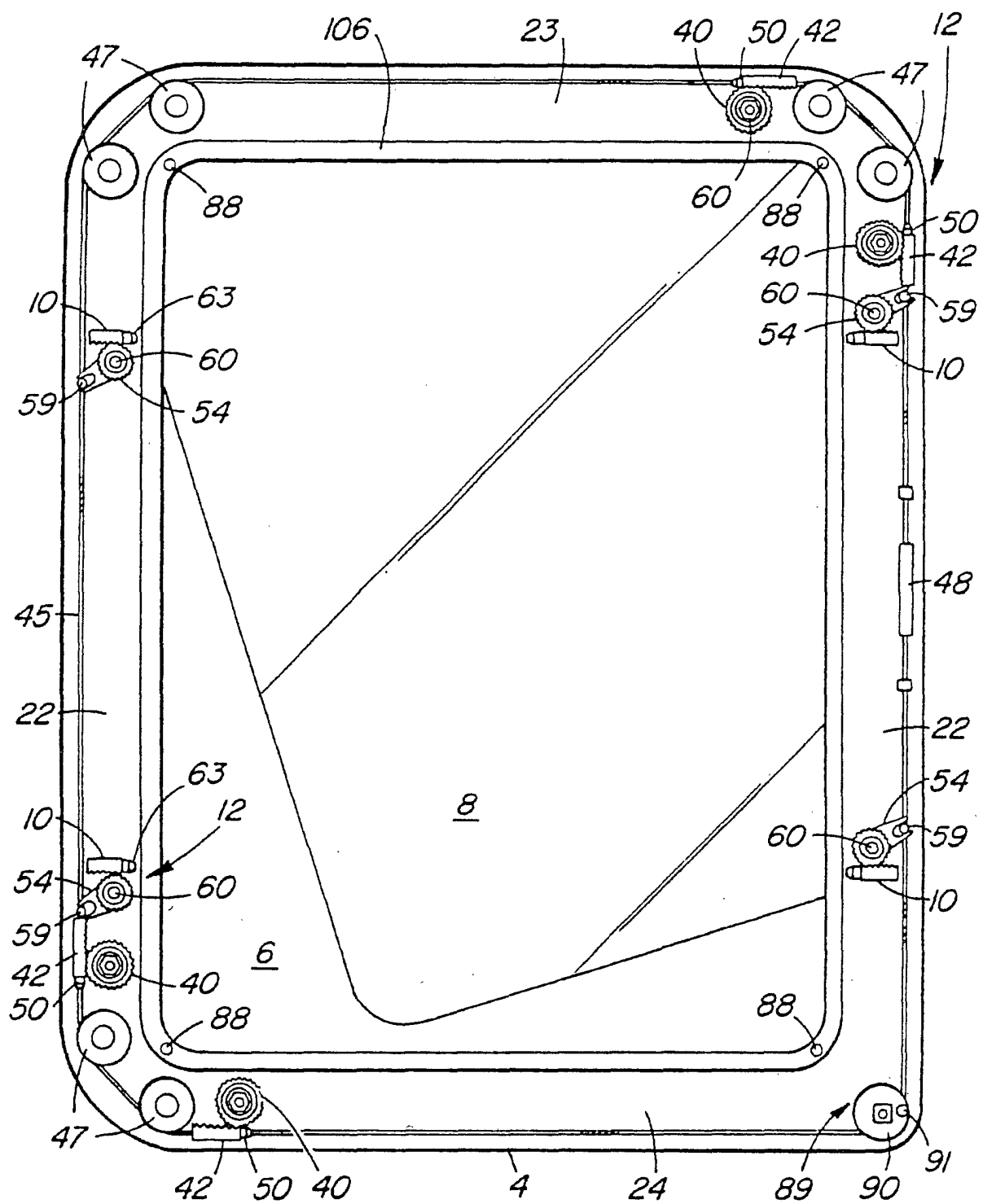


FIG. 3

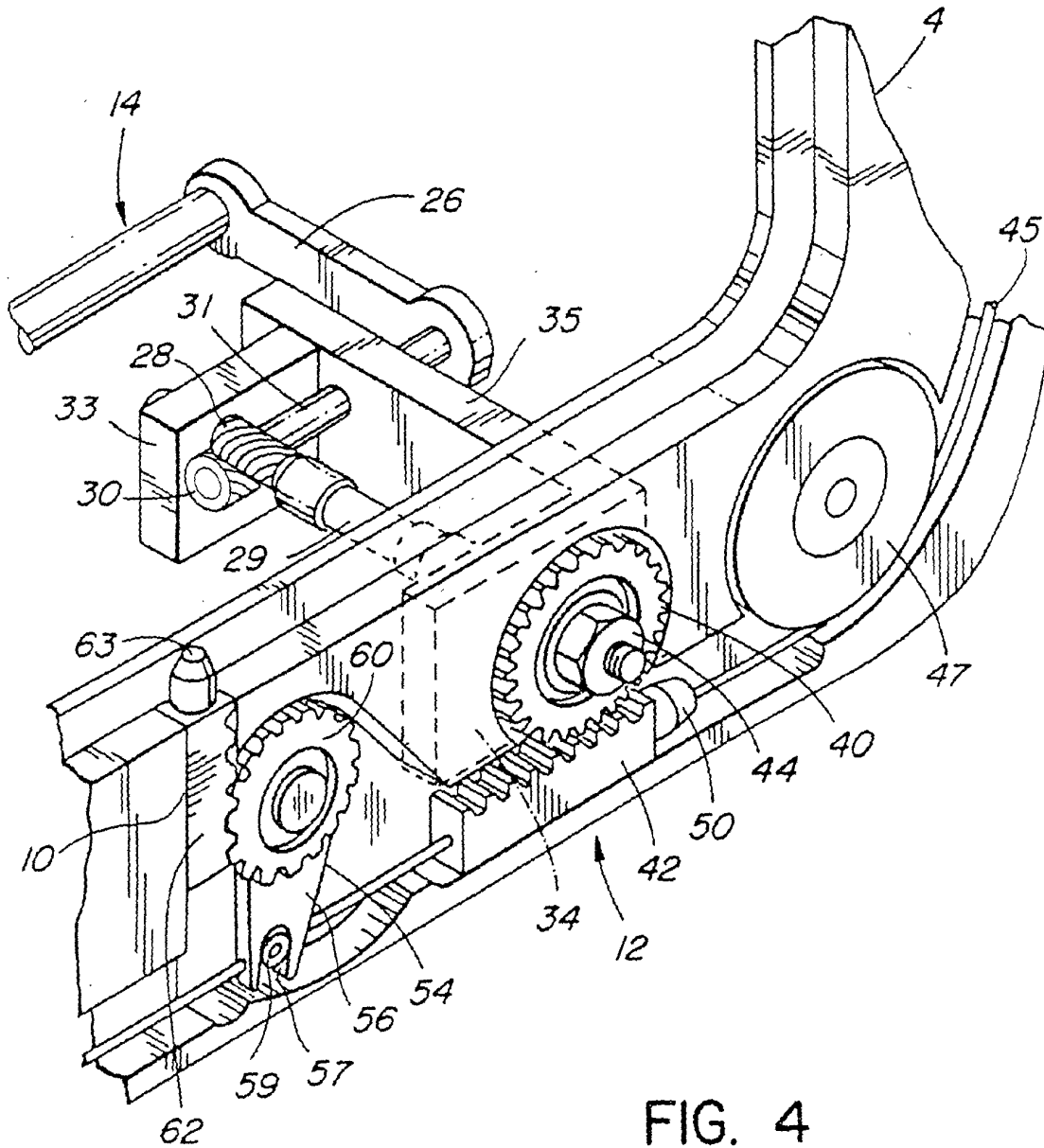


FIG. 4

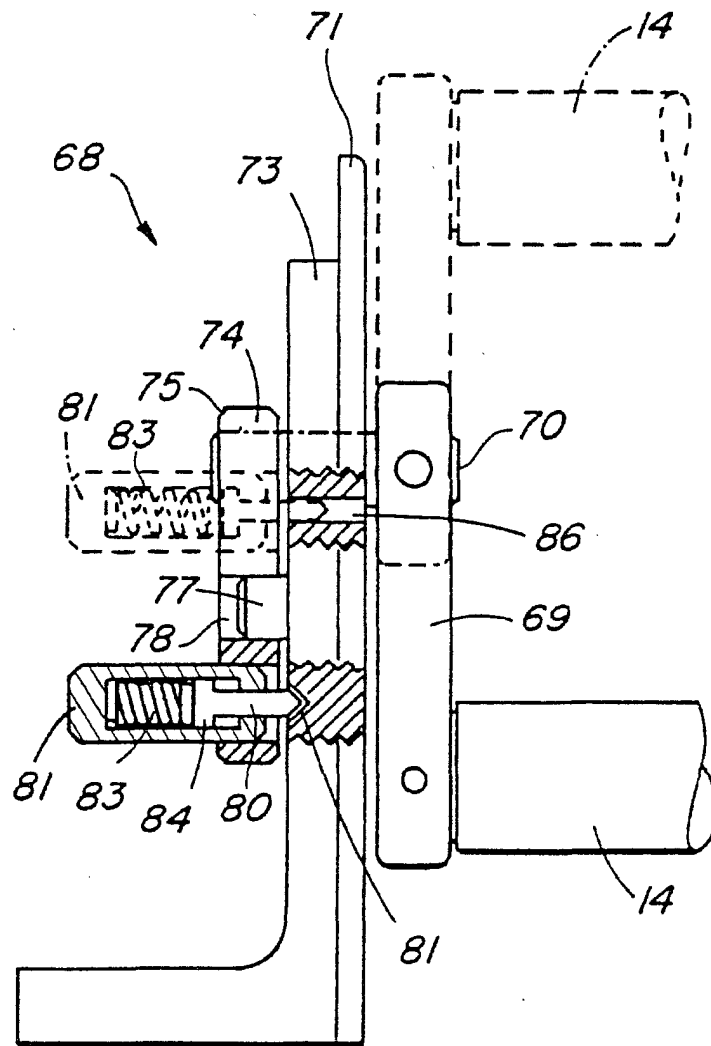
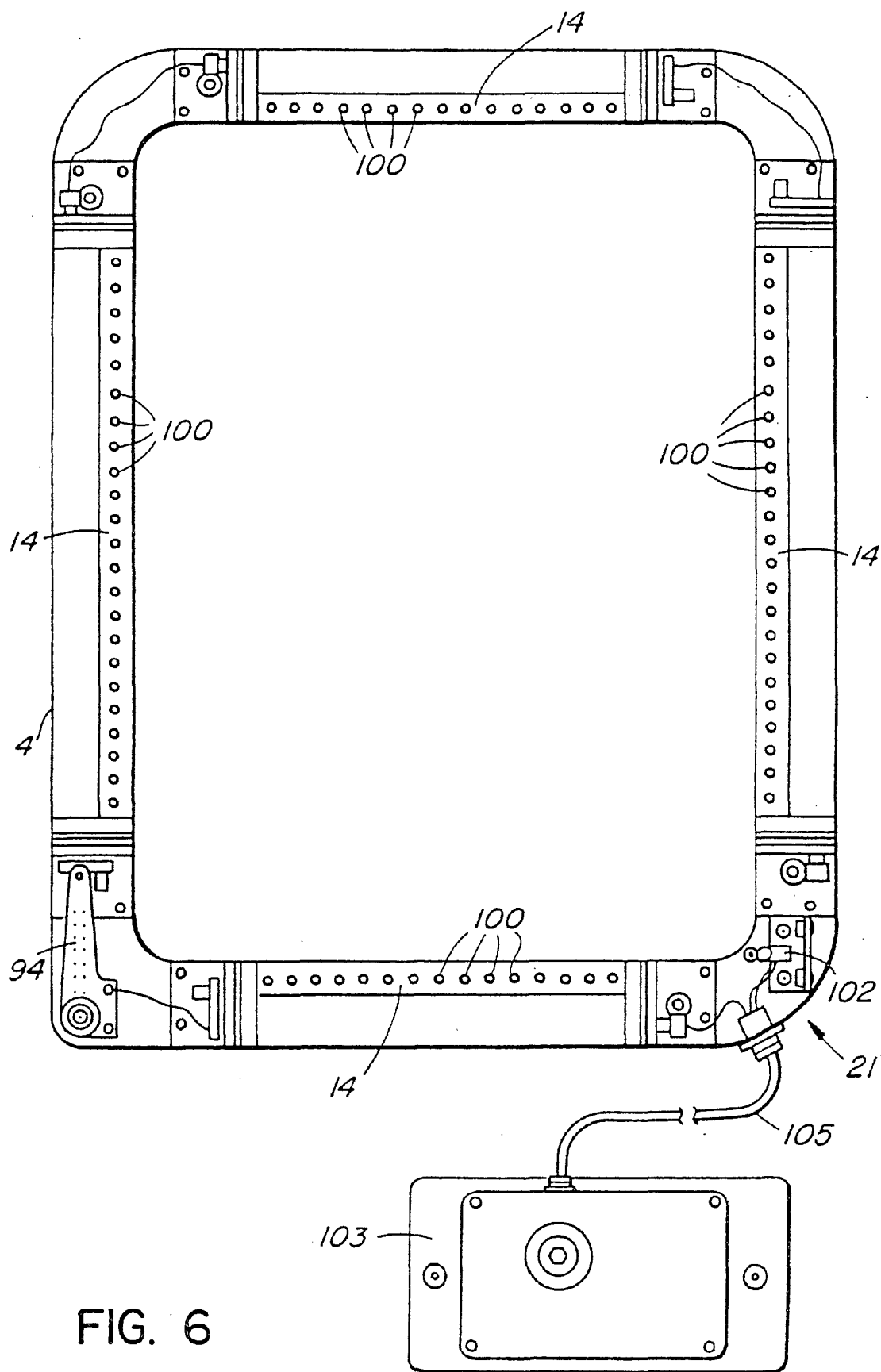


FIG. 5



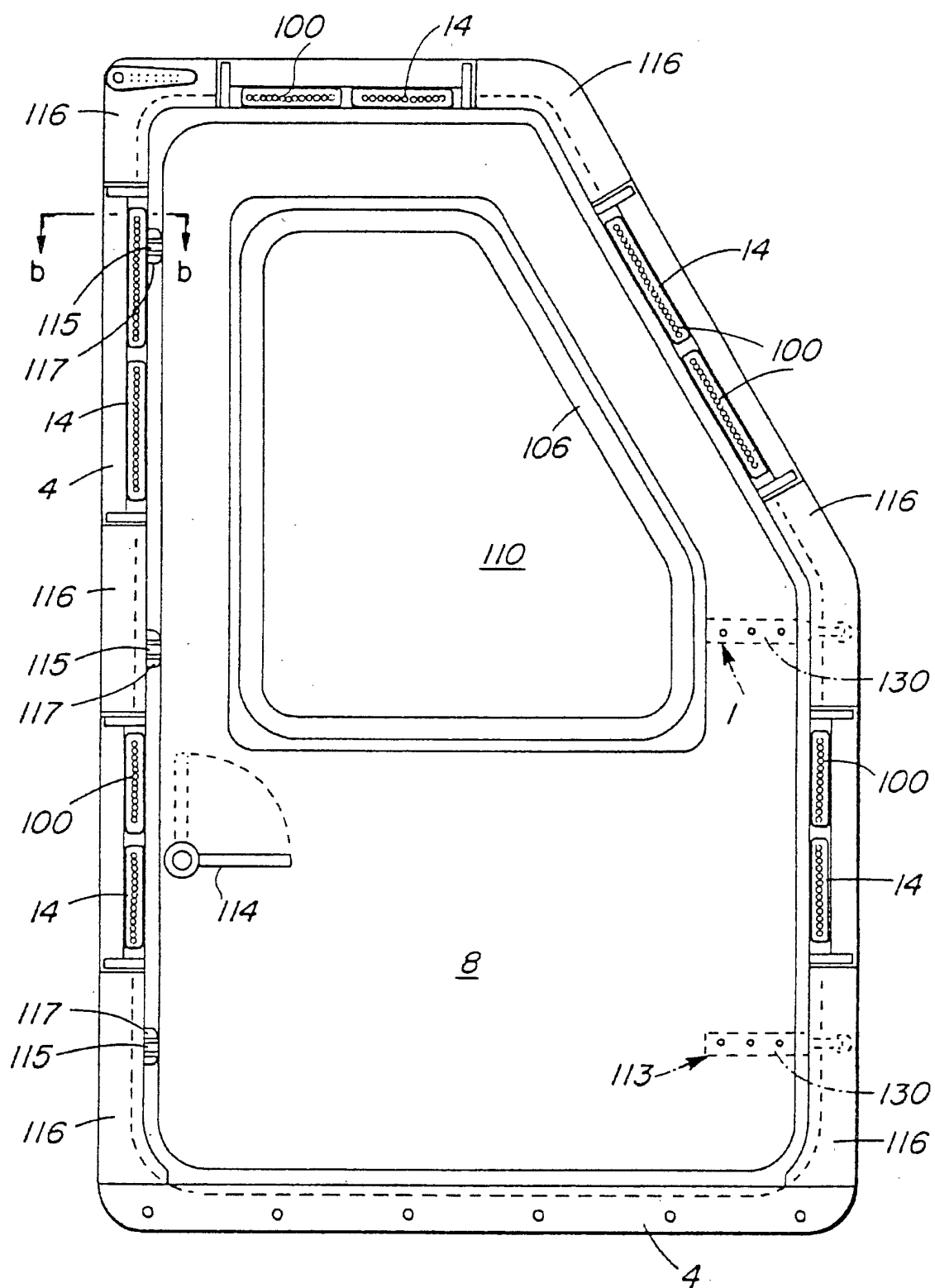


FIG. 7

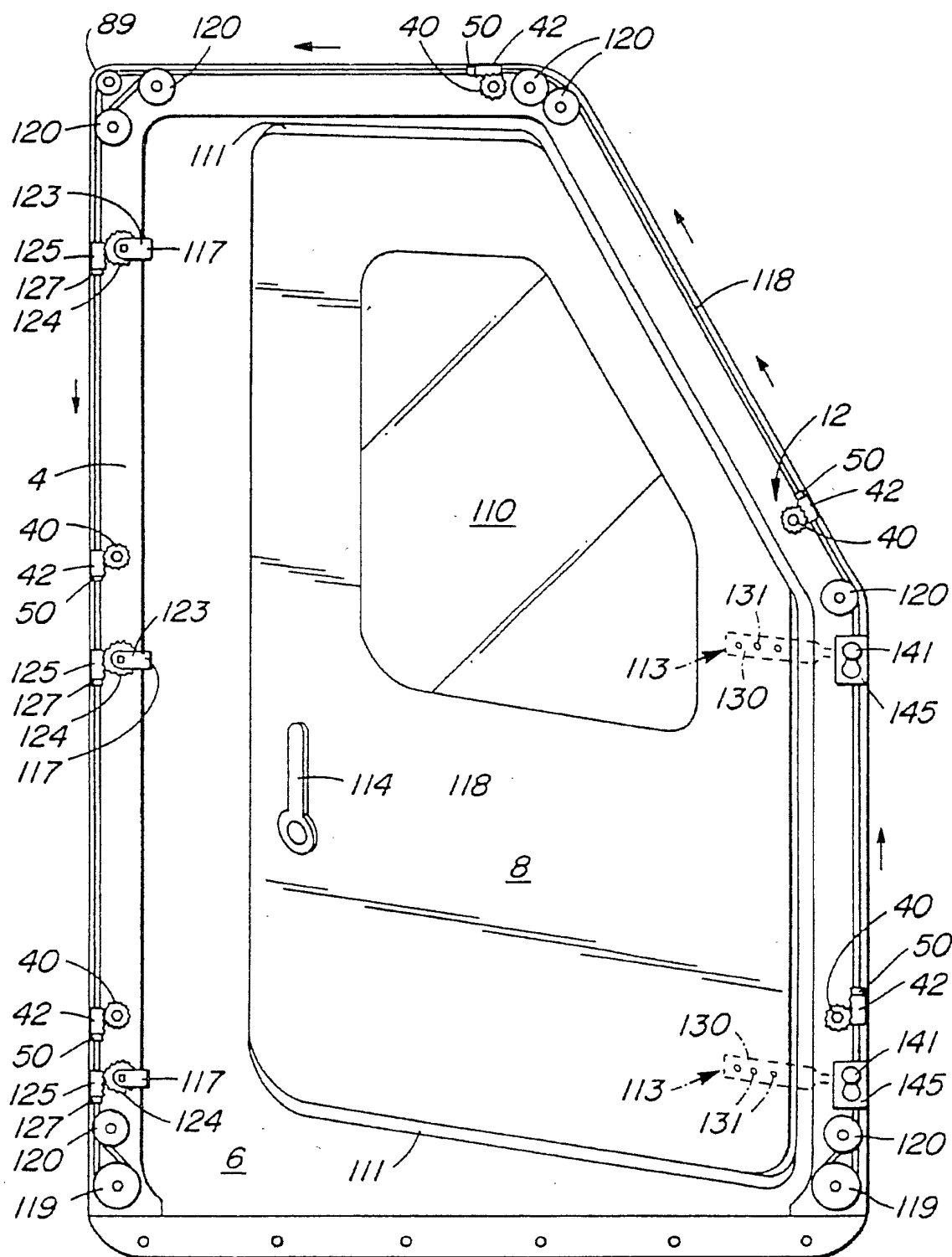


FIG. 8

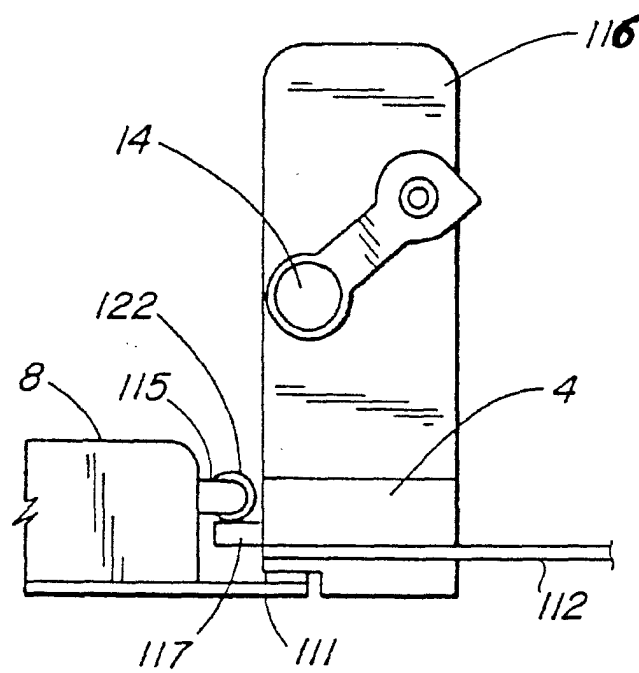


FIG. 9

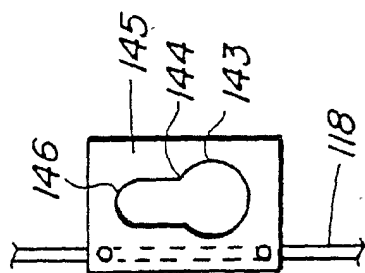


FIG. 10B

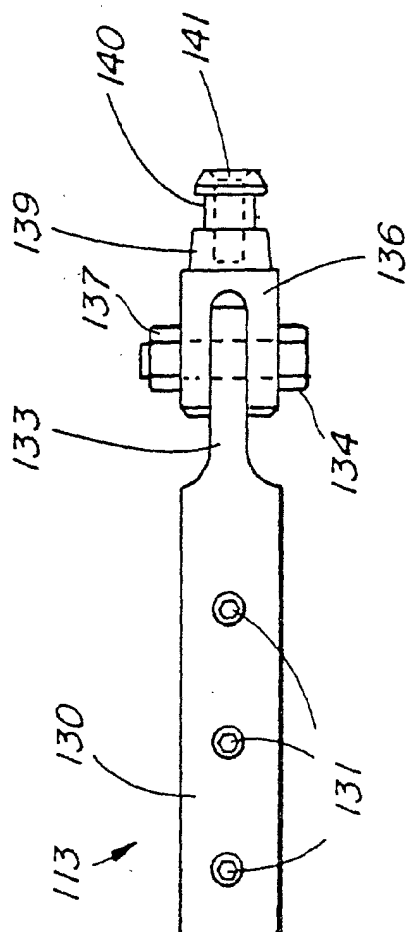


FIG. 10A